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BULLETIN No. 18.

DEPARTMENT OF AGRICULTURE, B. C.

MODEL FARM BUILDINGS

—BY—

F. M. LOGAN, B. S. A.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B. C.:
Printed by RICHARD WOLFENDEN, V.D., I.S.O., Printer to the King's Most Excellent Majesty.
1906.

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To

DEPARTMENT OF AGRICULTURE, B. C.,
VICTORIA, 19th June, 1906.

I have the honour of presenting the following bulletin on the construction of Model Farm Buildings, prepared by F. M. Logan, Esq., B. S. A., for distribution amongst members of Farmers' Institutes and for general information.

J. R. ANDERSON,
Deputy Minister of Agriculture.

To the Hon. R. G. Tatlow,
Minister of Agriculture.

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MODEL FARM BUILDINGS.

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Introduction.

So many plans have been drawn and so many farm buildings have been described, that it may seem absurd for any one at this date to suggest any design that would be an improvement on those already in existence. In spite of this fact, I am taking the opportunity of presenting plans and specifications of farm buildings, which, I believe, are different from any before shown, and which, I trust, contain sufficient merit to warrant their adoption by the public.

In all sections of Canada I find farmers erecting inconvenient, unsanitary, badly ventilated, half-lighted stables, when for the same money, properly spent, they might have convenient, comfortable, sanitary, well ventilated and properly lighted stables. This often occurs because the farmer has no plans available, or, if he has, they are probably impracticable or would prove very expensive if adopted; so the result is, he builds another stable like the old one, or perhaps like one that his neighbour has.

To offset any prejudice which might arise in regard to accepting plans from a non-professional architect, I might mention that I have had considerable experience in building work, and am able to frame or construct any ordinary wooden building; so the ideas here presented are not theories derived from books, but have been gathered by personal experience and observation. This knowledge has made me a close observer of the farm buildings in different parts of Canada, which it has been my privilege to inspect, so I shall discard the poor features and endeavour to incorporate in this bulletin as many good qualities as possible.

I have just received the following letters in regard to the design of the Feed Barn and Stables which are herein described. Mr. A. C. Wells, the well-known stockman of Eden Bank farm, writes as follows:—

"Sardis, B.C., June 22nd, 1906.

"*F. M. Logan, B. S. A.,*
"*Victoria, B. C.:*

"Dear Sir,—There is great need in this Province, as well as in other parts of Canada, of information which will result in better lighted, better ventilated, and more sanitary stables; so the bulletin you purpose having published is just what is needed.

"We have on our farm an up-to-date 'Bank' barn, built at a cost of about $4,000. If I were building again, however, I would adopt your plans, as I can see that these stables would be much better lighted, easier to ventilate and keep clean, than our present stables.

"I have tried several methods for tying cows, but failed to find one that would keep them clean, until I adopted separate stalls, similar to the one you recommend. Every farmer who keeps cows should have them put in his stables.

"Hoping that your suggestions for better farm buildings will do much to improve the dairying and livestock conditions in Canada,

"I remain,

"Yours truly,

"A. C. Wells."

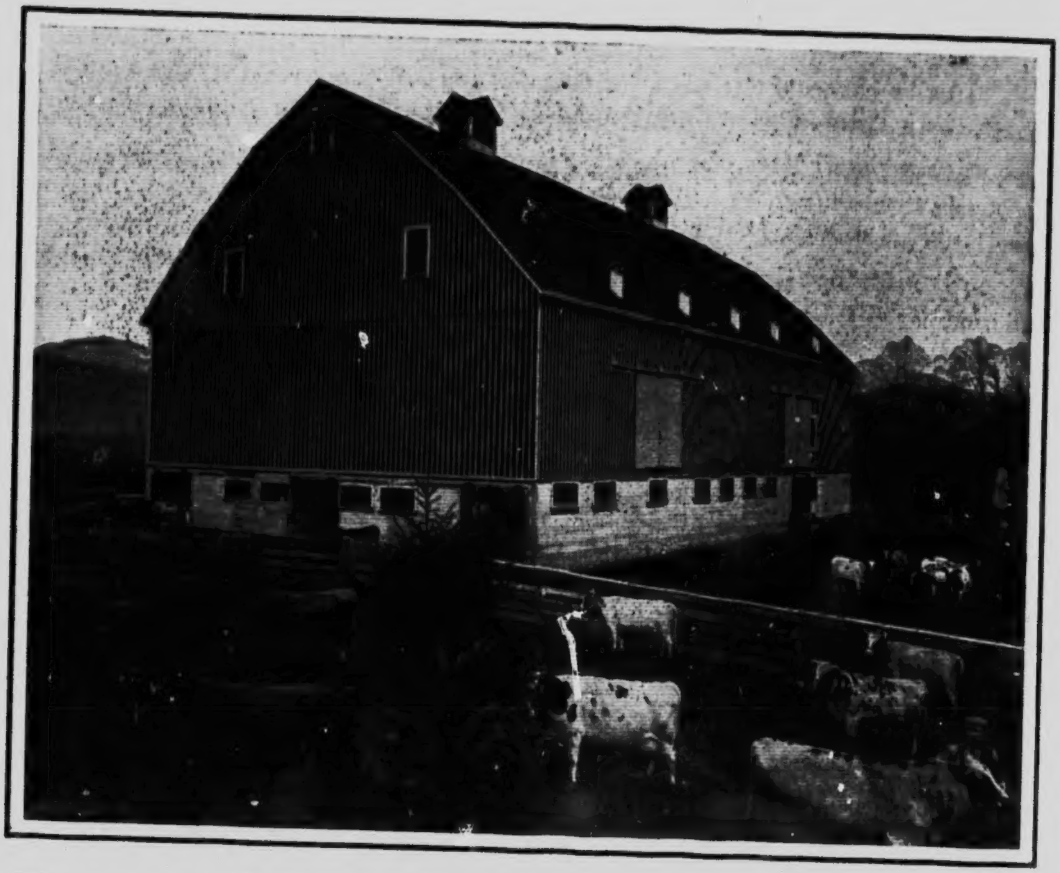


Fig. 1.—A Bank Barn on the farm of A. C. Wells & Son, Chilliwhack. Built at a cost of $4,000; the most expensive barn in British Columbia.

Mr. H. Davidson, Secretary-Treasurer of Hastings Shingle Manufacturing Co., Ltd., with head office at Vancouver, sends me the following:—

"Vancouver, B.C., June 27th, 1906.

"*F. M. Logan, Esq.,*
"*Department of Agriculture, Victoria, B. C.*

"Dear Sir,—I am delighted with the plans of the hay barn and stables which you so kindly furnished me some time ago. The barn which I am building on my farm at Langley is now well under way, and, as it nears completion, its superiority over the 'Bank' barn, which we proposed building before you brought the plans in question to our attention, is more and more marked. For convenience and utility it is going to be just about perfect, and the stables will be much more sanitary and so much better lighted than those in a 'Bank' barn. While I am unable to say definitely, yet from the figures at hand I feel certain the cost will be at least 30% less than it would have been had we gone on according to our original plans. This feature alone in connection with the design is a very important one in the construction of a building of considerable dimensions.

"The cow stalls I like very much, and will adopt the idea in our stables. It seems to me that, if farmers generally adopted them, the standard of our dairy products would be considerably raised and there would be little heard from health inspectors and milk vendors in regard to filthy stables and bad milk.

"Thanking you for the interest you have shown in the building, and the trouble to which you have been put in connection therewith.

"Yours very truly,
"H. Davidson."

The following letter is from Mr. George Heggie, manager of Sir Arthur Stepney's large ranch at Enderby, B. C., who contemplates building a large barn and stables according to this design. I might mention also that Sir Arthur Stepney called at the office a few days ago and requested that "blue prints" of this design be sent to the manager of his estate in England, so that these plans might be adopted there as well:—

"The Stepney Ranch,
"Enderby, B. C., June 22nd, 1906.

"*F. M. Logan, B. S. A.,*
"*Department of Agriculture, Victoria, B. C.*

"Dear Logan,—Your letter and plans at hand. I must congratulate you on the excellence of your production. It must have cost you many anxious hours of thought and labour to get your ideas put together in proper shape. I have studied out your plan carefully and, speaking generally, think it is O. K. I can assure you I feel very much indebted for the very valuable assistance you have given and are giving me in the matter.

"Believe me,
"Yours sincerely,
"George Heggie, *Manager.*"

BANK BARNS.

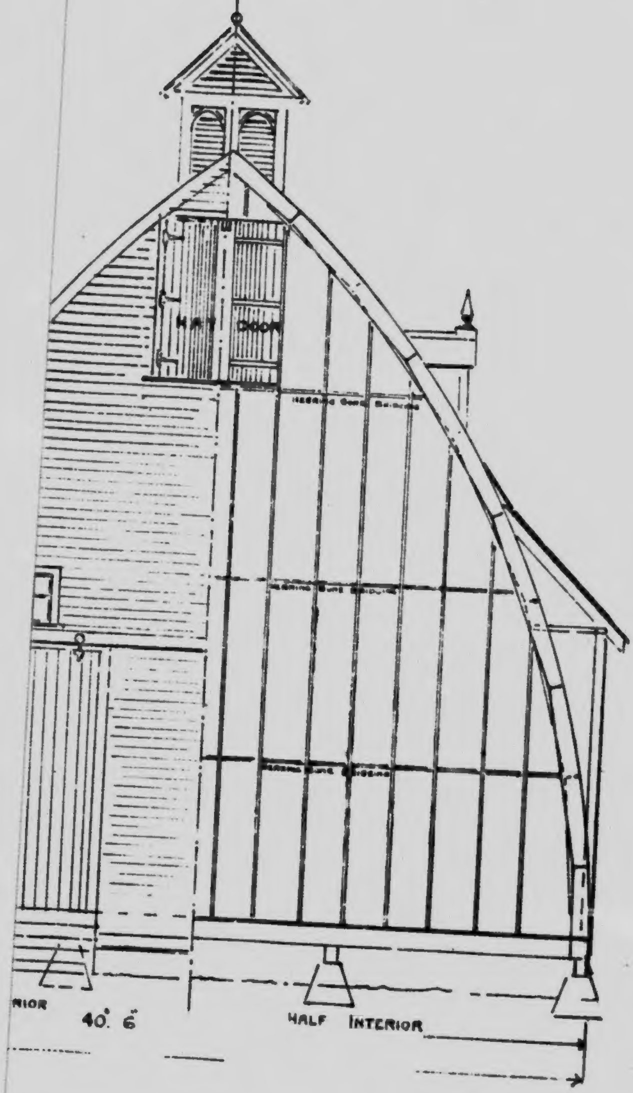
In Canada I find a large number of the expensive barns are what are known as "Bank Barns," *i. e.*, built on a side-hill or bank, and being two storeys, or more, in height. This style of barn has the advantage of being compact, with less roof for the space enclosed than a barn of only one storey. On the other hand, they are seldom, if ever, properly lighted; the approaches, root cellars, width of stables, etc., making it very difficult to do so. I remember inspecting a large bank barn in Ontario, which was erected as a model—expense not considered. This barn was 60 x 100 feet, with stock in the basement. There were approaches at each end, and root cellars all along one side, so the light for 70 head of cattle had to be admitted entirely from one side. There were a few windows set in a thick stone wall, and, as is often the case, the stock were in darkness most of the time, besides making kerosene lanterns indispensable while doing work in the stables on dull or cloudy days.

Difficult lighting is not the only disadvantage of this style of barn; they are very difficult to properly ventilate, with the result that the air in them is always bad. Then when hay or straw it let down through chutes from the floor above, the stable is filled with a fine dust which settles on everything in the stable, and if the stock consists of milch cows, a large part of this finds its way into the milk.

Apart from the dust question, which is certainly a serious one, feed should never be kept directly above the stables. No matter how good the ventilation is, the warm, foul air from the stock will find its way through the chutes and floor, and contaminate the hay to a greater or less extent.

Still another objectionable feature which should be mentioned. If a farmer keeps all his stock in one large stable, danger from disease is greatly increased, and he has not the same opportunity of isolating the animals first attacked, that he has when the stock is kept in two or more different stables.

A bank barn requires stone or concrete walls for the first storey, which makes it too expensive for the farmer of ordinary means. The plan of barn and stable which I shall describe overcomes all of these objectionable features, and at the same time can be built at a very moderate cost.


HAY DOOR
HERRING BONE BRIDGING
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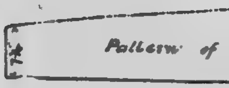
HERRING BONE BRIDGING
RIOR
40' 6"
HALF INTERIOR

between.



ELEVATIONS OF A MODEL
COMBINED FEED BARN & STABLES

Designed by F.M. Logan, B.S.A.

SCALE 4 FEET TO ONE INCH.

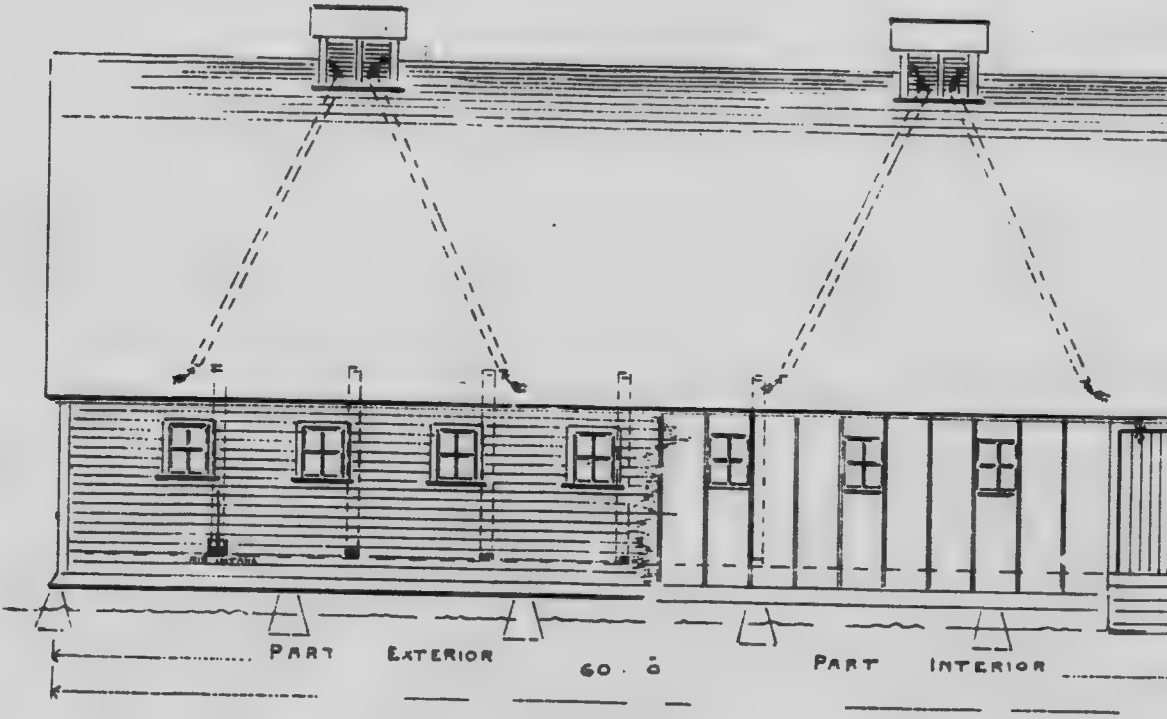
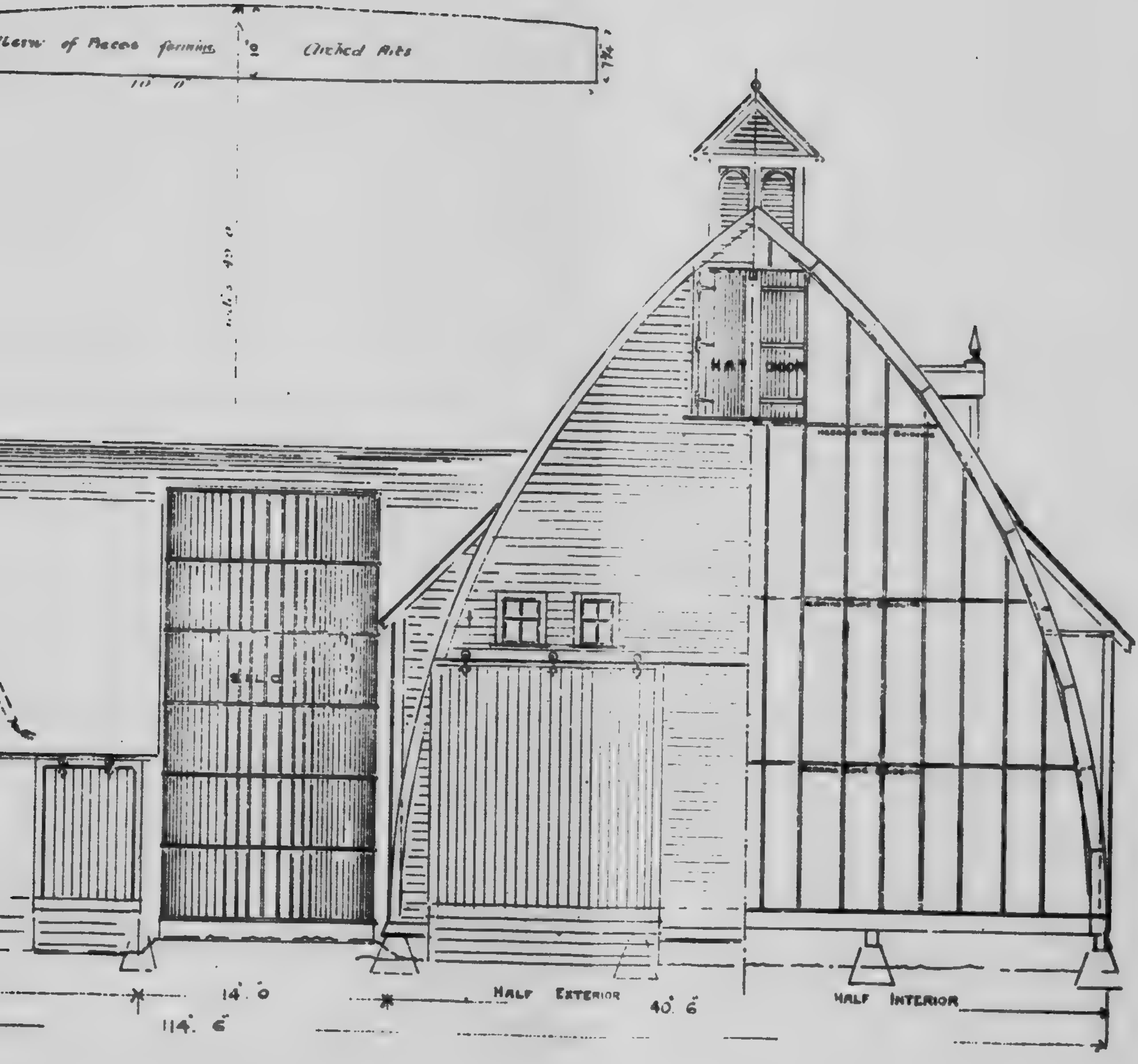
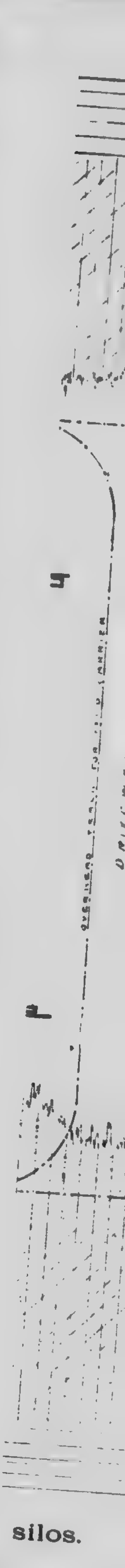


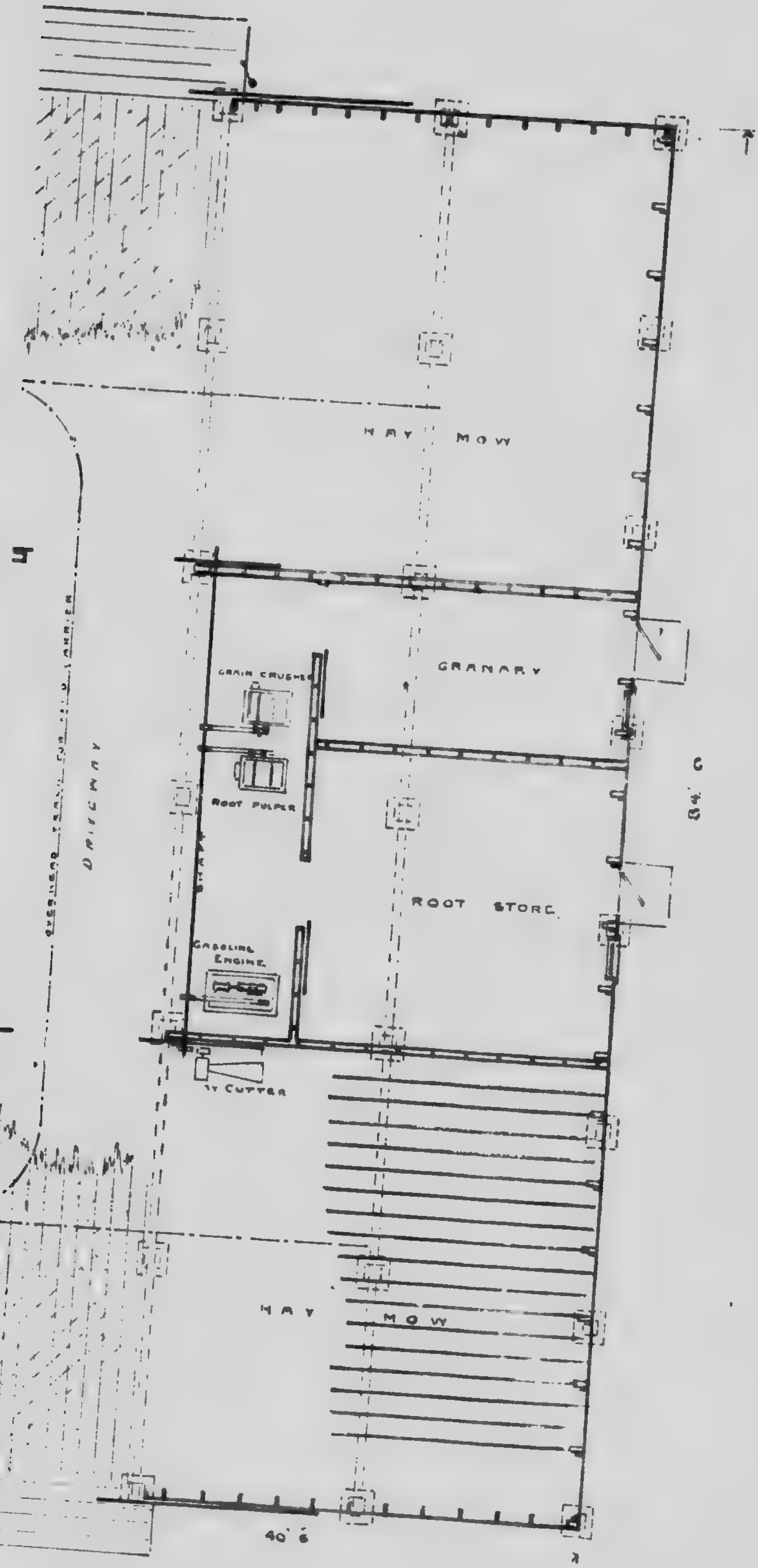
Fig. 2.—Showing side view of cow stable an



ble and end view of feed barn, with silo between.



silos.


HAY MOW
GRANARY
GRAIN CRUSHER
ROOT PULPER
ROOT STORE
GASOLINE ENGINE
CUTTER
HAY MOW
DRIVEWAY
OVERHEAD TRACK FOR FEED CARRIER
34' 6"
40' 6"

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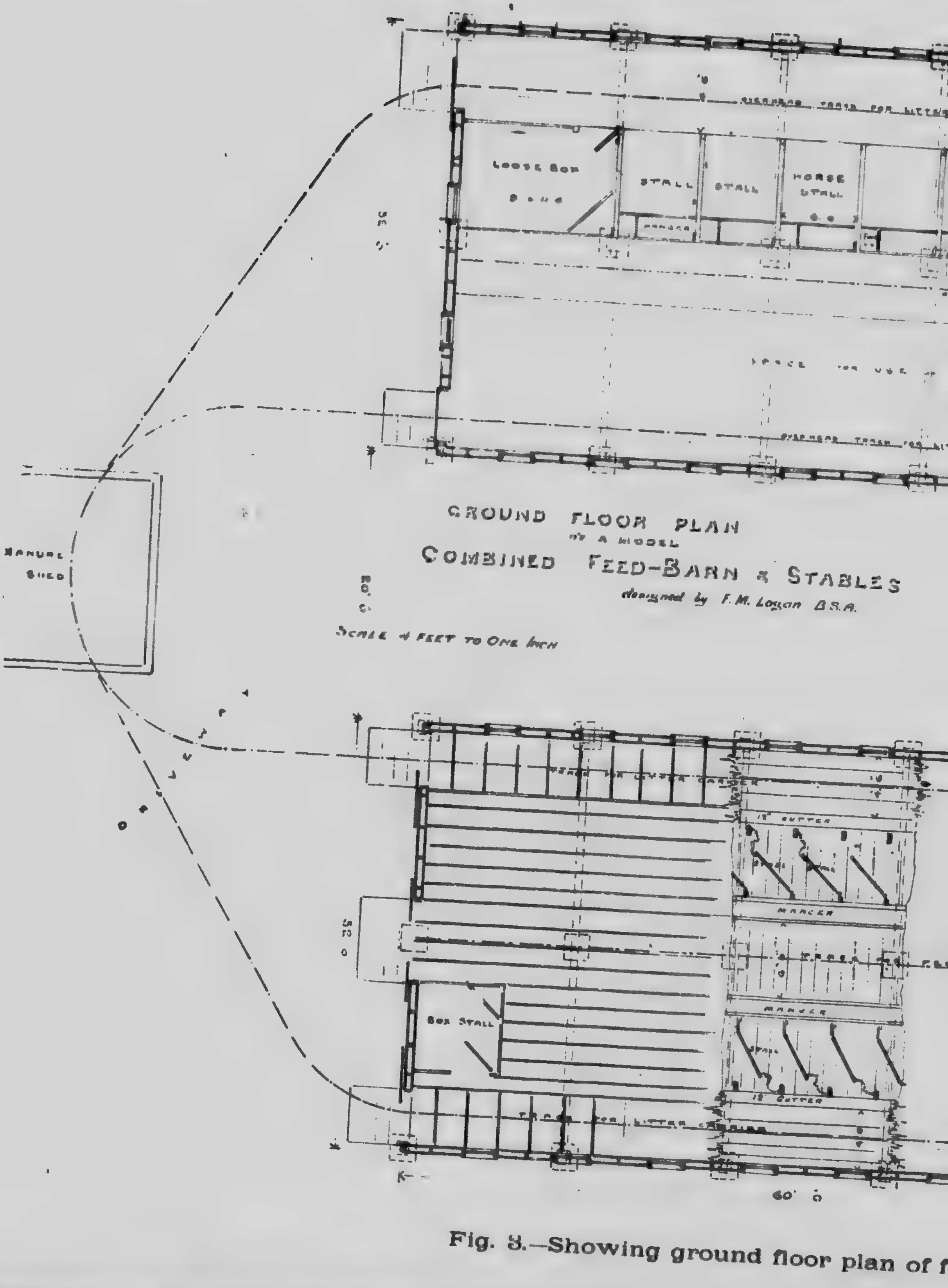
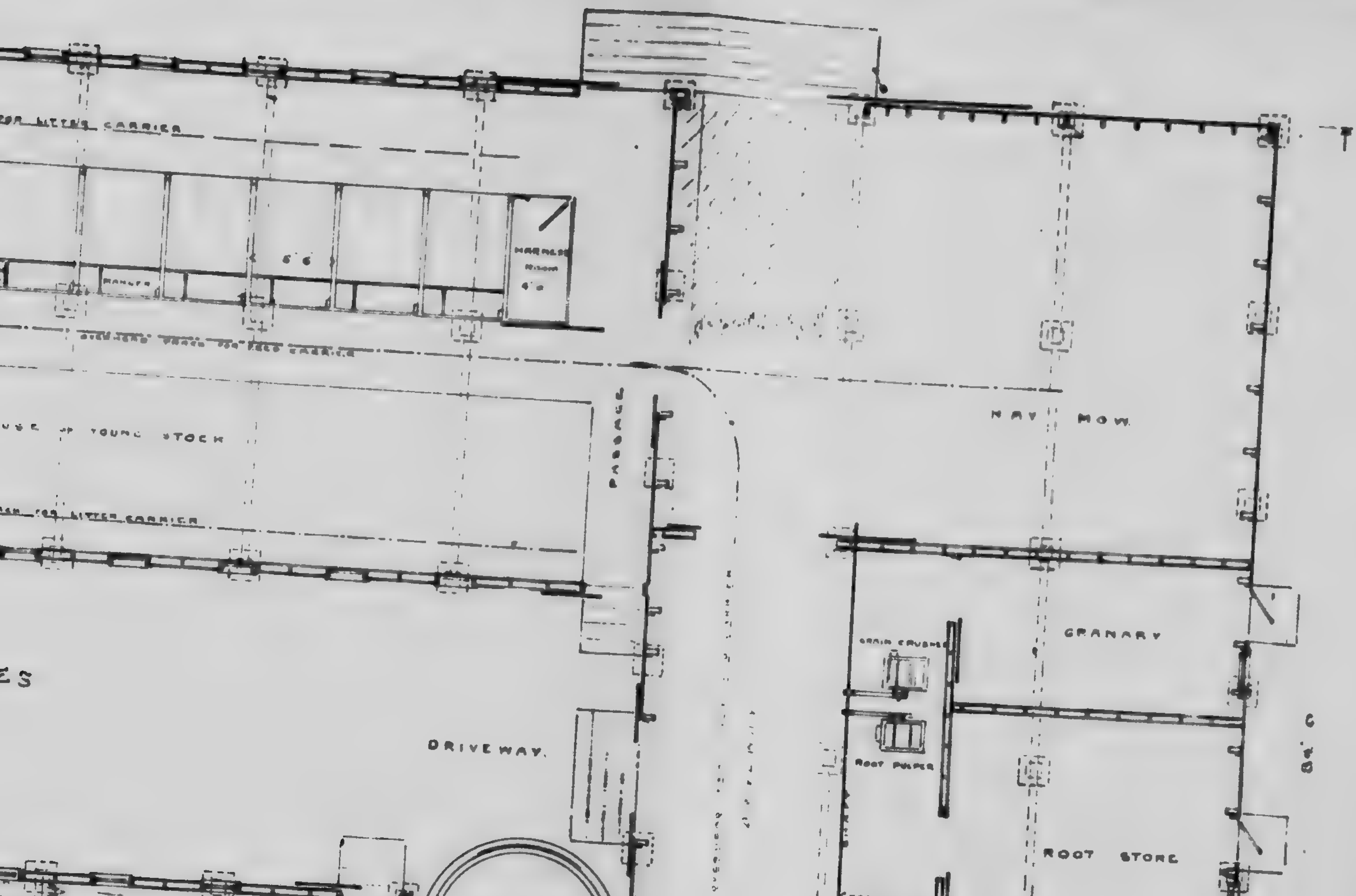


Fig. 8.—Showing ground floor plan of f



an of feed barn, cow and horse stables, and silos.

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THE MAIN BARN EXPLAINED.

In the framework of this structure I am introducing some ideas which, o far as I know, have never been presented, and to those unacquainted ith architecture may seem unsound. To allay any fear in this regard, I ight mention that I have shown this design to four different architects, all whom agree that it will make an unusually strong structure. The advan- ges of an arch-frame such as shown in Fig. 2 are, first: it overcomes the ed of cross-beams, which are necessary in the ordinary frame, and which ways interfere more or less with the storing of hay or grain. For instance, a barn is required simply for the storing of hay, there need be no beams, ds or posts apart from the outside walls, so that every foot of space would available; even the driveways could be filled, as the hay could be taken through a door in the gable. Then, in taking out the hay, if the surface re floored, a team could be driven in any direction, as there would be no ts, studs or beams to interfere, and it would not be necessary to carry the any distance to the press or waggon. A frame, such as described, uires several thousand feet less timber than one of the old-fashioned kind, ides being stronger, less expensive and less difficult to build.

THE ARCHES.

You will notice that these arches are made by spiking together two ks 2 x 10 inches, cutting or sawing the edges to give a curve to the arch. sides of this arch constitute the segment of a circle, so will have the curve in all parts. In constructing them, all that is necessary is to a pattern of one plank, which, of course, will have the right curve to any part of the arch, so all the other planks can be cut from this rn. These could all be sawn the proper shape at the mill, and instead rpenters spending several days to frame your barn, all that would be sary would be to spike the planks together, raise the arches, and your would be up. This should be done by three men in less than two days, it would take three men eight or ten days to frame and raise an old- ned barn of this size. One man told me that it cost him $85 to get of this size framed, while another stated that he had paid over $100, re is a difference worth considering.

he arches may be placed about four feet apart, so that no other rafters essary. If thought advisable, a stud can be put in between each arch he sides, but it will scarcely be found necessary if good ship-lap or oarding is used. Of course, it is necessary to curve the arches right e ground to give them strength, so the upright studding and short are put in to make a perpendicular side. As the arches are four feet e space between can be used for hay, giving almost as much space as rches were perpendicular as far as the eaves. The boarding on the course, runs crosswise of the arches, and can be covered with either or steel roofing.

A PATTERN FOR MAKING THE ARCHES.

A pattern from which to cut the planks for the arches can be made in the following manner:—Decide upon the width and height of the barn you desire to build; take a large sheet of paper, and mark out, according to scale, one inch to the foot, if paper is large enough. Then from a centre in line with the lowest point of the arch describe a circle which will pass through the highest point or peak. The shape of your arch will, of course, depend upon the length of your radius. The radius used for this plan was 49 feet, while the barn is 40 feet 6 inches wide and 40 feet in height. The arch thus made can be divided up into equal parts of about 10 feet in length, the dividing lines, of course, running to the centre of the circle. By measuring the distance between these dividing lines on the outside and inside of the arch, also the width in different places, if, say, planks of 10 inches in width are used, you will know then exactly what size and shape your pattern should be.

Care should be taken in making this pattern, as the better the joints fit the stronger your arch will be. If they are made so the joints come in the centre of the other plank, and nailed on both sides firmly with 4-inch wire nails, they should make a structure having three or four times the strength of one constructed in the old-fashioned way.

THE DRIVEWAY.

This plan shows the large doors in the ends, and a driveway extending along one side from end to end, making part of the feed-room serve a double purpose. Some might object to this, but as it would not be necessary to drive through often, except in haying time, I do not think it would prove inconvenient. Of course, the driveways could run across the barn and have the main doors in the side, rather than the ends, but would utilise more space, and would not be as convenient probably as if arranged according to this plan. An objection might be raised that, in unloading hay, the track hung in the peak of the barn would not be directly over the load if standing in the driveway. This objection can be easily overcome by leaving a driveway crosswise of the barn till most of the hay is stored; this space could, of course, be filled later on, from the driveway or through the door in the gable.

THE ROOT CELLAR.

In this plan the root cellar shows above the first floor, which is much more convenient than if located below. In filling the cellar, the roots can be elevated with horses, as is done with the hay, and dropped into a chute above the ceiling. When you wish to use them, you are not obliged to carry them up a flight of stairs, but can load them directly into a hand trolley or overhead carrier.

In a large part of this Province, where frost is not extreme, the question of keeping it out of a root cellar is not a serious one, and in the plan shown there is only one wall of the cellar exposed to the outside, which makes the problem still more easy. If the walls of the root cellar were double-boarded on the inside of the studs, with paper between the boards, there would be little danger of frost. It could be made still more secure by stuffing the walls with sawdust, but I do not think it would be necessary for the coast climate, at least. The windows, of course, would need to be double, where the frost is at all severe.

The plan shows the root cellar and granary to be eleven feet in height. It is necessary to have the feed-room ceiling this high, so that a load of hay can pass through if necessary, and if the ceiling of the root cellar and granary is the same height, the joist can be run all the way through or be spiked together in the centre, and thus strengthen the frame. However, this is not absolutely necessary, so the ceiling over the root cellar and granary could be lowered to whatever height was desired, and that over the feed-room left at eleven feet.

The Granary.

This room should have a passage running along one side, with the remainder divided into bins for grain, with a window in front and a door at either end, opposite the passage. With a little care, this room can be made practically mouse-proof. A mouse cannot gnaw a hole through a board clinging to the side of a perpendicular wall, so be careful to leave no shelves for them to stand on, near places that they are liable to attack. A little sheet iron or tin used in the right places will do much towards this end. The overhead track can, of course, be made to run into this room if desired.

The Feed-Room.

By locating the feed-room in the centre of the main barn, it is convenient from several standpoints. First, it is but a short distance from either stable and can be utilised in preparing the feed for both. Then if the hay is cut before being fed, the cutting box can be set at either side of the feed-room, making it necessary to move the hay but a short distance, both before and after cutting.

A plan which many feeders of live stock follow, with excellent success, is to mix the ensilage, pulped roots, mashed grain, and cut hay together for several hours before feeding. If this is done, the moisture of the roots and ensilage is taken up by the dry hay and grain and made much more palatable and relished much better by the stock. The feed-room shown in the plan could not be better located for this purpose, as it is surrounded by hay, with the ensilage, roots and grain all near; at the same time, it is far enough from the stables to avoid any danger of contamination from foul odors.

The Engine.

The engine shown in the plan is intended to be of the gasoline type, which would probably be the least expensive and most satisfactory for the purpose. It could be set in one corner of the feed-room and would take up very little space. If a tread power were used, it could be located just off the driveway, near the door leading into the feed-room, and could be connected by belting with the overhead shaft. This shaft should run through the feed-room and project sufficiently on each side to admit a pulley from which a hay cutter could be run. The grinder and root-pulper can be operated from the same overhead shaft.

THE TRACK FOR FEED-CARRIER.

The overhead track may be 10 feet or more from the floor, so it will not interfere with anything except a high load of hay. The track shown to extend part way across the hay mow, can be hung on wires extended from the rafters, then, if made to hinge near the switch, it could be drawn up to the roof out of the way when not needed. By cutting down the centres of your hay mows with a knife, the feed carriers could be run in and loaded, making it unnecessary to carry the hay any distance. A wooden rack, 6 or 8 feet long, could be made, which would carry feed sufficient for 15 or 20 cows at one time, and would prove a more convenient and rapid way of feeding stock (as well as being far more sanitary) than by putting the feed down chutes and then carrying a forkful at a time along the passages. If desired to mix the ensilage, cut hay and grain together, a door could be made in the silo opposite the feed-room and a chute in the wall of the barn opposite this, so the ensilage could be thrown from the silo directly into the feed-room, or it can easily be brought around in the carrier, from the room between the silos.

DOORS.

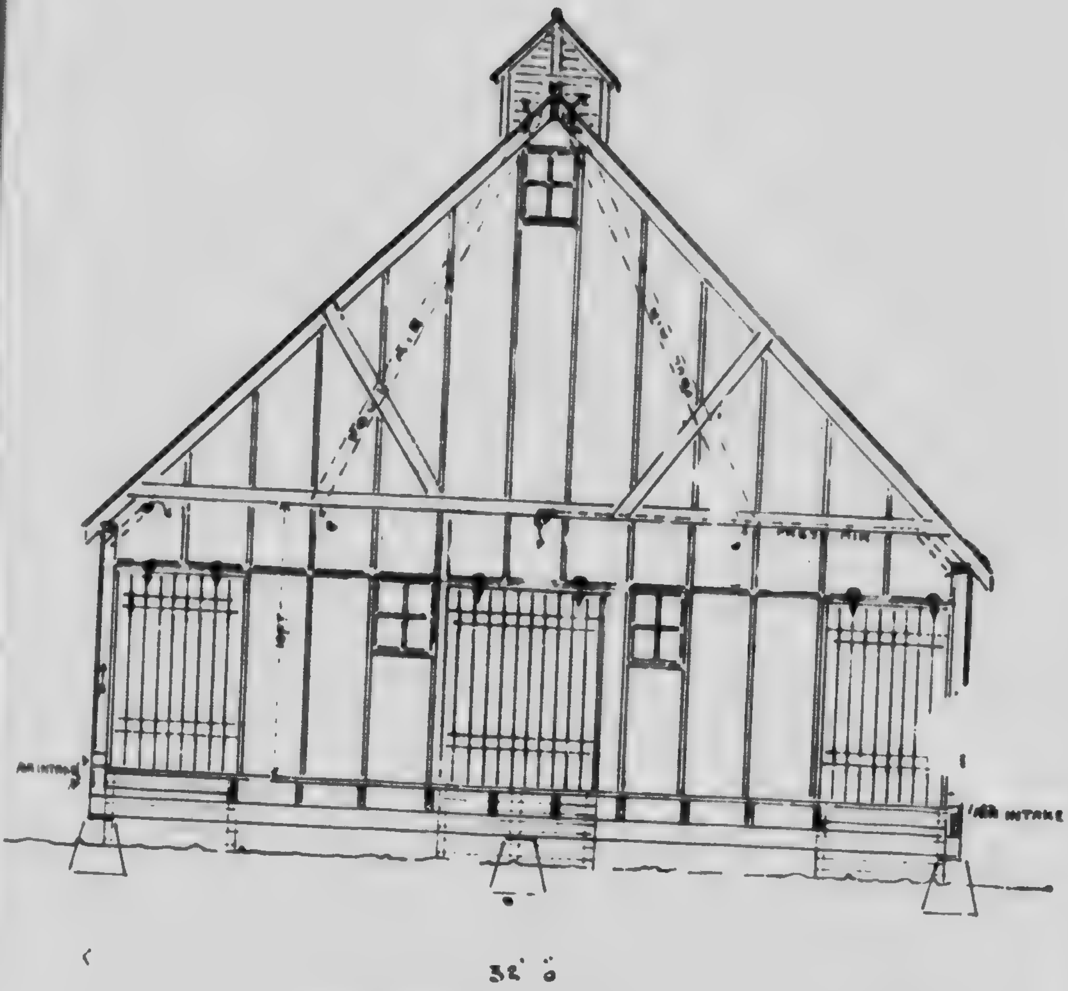
The plan shows doors 8 feet in width between the feed-room and the driveway between the two stables. This will permit taking a team through if required. The doors on each side of the feed-room are 10 feet wide and about 11 feet high, or just so they will roll back under the feed-room shaft. One of these doors should be 7 feet in width and the other 3, so they will meet just at the overhead track. The doors for the root cellar and granary may be on either side of the wall, but would probably be most convenient as shown in the plan. The large doors at each end are 13 feet in width and 13 feet high. Rollers which run very easily are now being made with ball bearings, and run on a hollow tube for a track. It is impossible for the wheels to get off the track, so, altogether, they are far ahead of the ordinary roller. They are called "The Reliable Round Track Door-hanger." Have your hardware man order them for you.

VENTILATION.

An air duct should run from the root cellar to the ventilator on the top of the barn, to carry off any bad odors from the roots. This can go up the side of the barn and follow the rafters, so need not interfere with the hay space. A fresh air duct may be brought in from near the ground similar to those shown in the stable plan. If this is done, there need be no foul odors from the root cellar.

FLOORS.

The driveway and feed-room should have a double floor; the first one-inch, and the top two-inch planks, laid diagonally, would make a good floor. The floor of the root cellar and granary would probably be better double, but the space under the hay will need only a single floor.



SECTION OF CATTLE & HORSE STABLE

SCALE. $\frac{1}{4}$ INCH TO ONE FOOT

Fig. 4.

THE OUTSIDE WALLS.

For the ends and sides, up as far as the eaves, rustic boarding of good quality will make a suitable wall. Ordinary rough boards covered with a cheap grade of shingles would also make a good wall, and one which would last a long time. If the boards are put on horizontally, they strengthen the structure much more than if they were put on perpendicularly. The roof can be made of rough boards covered with shingles or steel roofing.

VENTILATORS.

There should be three on peak of the barn, either built of wood or made from galvanised iron. The one in the centre should be larger than the other two, to give the barn a good appearance. The plan also shows a "Dormer" window half way up the roof. There should be two of these, about half way between the ventilators. They would serve to light the centre of the barn, as well as to add to its appearance.

A barn such as I have described would certainly not be very expensive, and when its convenient features are thoroughly considered, it should appeal to the ordinary farmer of Canada.

THE COW STABLE.

In visiting different stables in Canada, it is very exceptional to find one that is properly lighted, ventilated, or even decently sanitary, while if they had been wisely planned they could have possessed all these features, with very little additional expense.

LIGHTING.

In the first place, most of the stables are arranged so it is impossible for them to get sufficient sunlight. With a wide stable containing four or five rows of cattle, even with windows on both sides (which is seldom the case), the centre rows get little, if any, sunshine on them. As it is well known, fifteen minutes of direct sunshine is more effective in destroying disease germs than the strongest disinfectants, then how could a farmer invest money better than in buying windows? You will notice that this stable has windows on both sides and one end, and if located with the end towards the south, will admit sunlight through the east windows in the morning, the end windows at noon, and through the west side in the afternoon. It is better to have several medium-sized windows than to have a few large ones, as the light is better distributed, and there is less danger of breakage.

The windows can be made to serve as ventilators for hot weather, by having them arranged so they will come in a foot or more at the top, as shown in Fig. 5. The air will then shoot up to the top of the stable and drop evenly, instead of blowing directly on the stock.

VENTILATION.

A proper system of ventilation is another feature of great importance. Dr. J. G. Rutherford, before the Agricultural Committee of the House of Commons, speaking on tuberculosis in animals stated that: "Thousands of animals were yearly becoming affected, owing to unsanitary conditions under which their owners insist on keeping them, and the importance to live stock of thorough and effective ventilation was of infinitely greater value than tuberculin. To put the case plainly, he stated that stockmen were breeding tuberculosis a great deal faster through neglect of this important subject of ventilation than it would ever be possible to stamp it out by promiscuous use of tuberculin and the slaughter of diseased animals."

A statement such as this, coming from the best authority in Canada on the subject, should cause stockmen to stop and consider. If their stables are not properly ventilated, they should lose no time in having a system installed.

Ventilators are not expensive; they are much cheaper than diseased animals. A good system is made by conducting the air by means of a wooden pipe or box, about six inches square, from an opening through the side wall near the floor. These pipes are taken up the side of the stable, between the studding, with an opening near the ceiling, while every alternate pipe is taken across to the centre of the stable, the air being allowed to escape directly over the feed passage.

Air pipes should also run from openings in the ceiling directly above the stock (about half-way between the side wall and feed passage) to outlets in the peak, such as galvanised iron cowls, or properly built wooden ventilators. The warm air of the stable, rising and escaping through these pipes, causes a partial vacuum, so the pure air is brought in from outside to take its place. In this way a constant change of air is taking place, and instead of the stock inhaling and exhaling the same air several times, they are constantly taking in a fresh supply. The supply of cold air can be regulated by slides or doors at the mouth of the intake pipes, so the stable need not be kept unduly cool, even in severe weather.

THE FLOOR.

The floor shown in the plan is made of wood, the first cost of which is somewhat less expensive than concrete, but as it would have to be renewed, probably in ten years, the ultimate cost of a concrete floor would probably be less than if made of wood. The mangers in that case should be of concrete also, with divisions made of thin steel or wood, as described later, in the description of the cow stall.

Some prefer to cover a concrete floor with wood where the cow stands, as concrete makes a cold floor, as well as being slippery. However, if the cows are tied in the manner described there would be little danger of their slipping into the gutter, and it would be much easier to keep the bedding under them than if they were tied by the neck. From a sanitary point there is no comparison between the two floors, and, where possible, the concrete should be used every time. The gutter should be 10 inches deep and 12 inches in width will be sufficient.

THE PASSAGES.

The walks behind the cows, as shown in the plan, are 5 feet from the gutter to the outside of wall, which will be sufficient if the manure is taken out with a litter carrier, but if you wish to load it into a cart and take it away with a horse, the stable should be made 3 or 4 feet wider, so the passages will be wide enough to admit of a cart and horse. The passage between the two rows of cows is 6 feet in width, and in feeding green feed in summer, the horse and waggon can be taken along this driveway and the cows fed direct from the load; the centre door at the end of the stable will allow this to be done if your waggon is not more than 6 feet in width. The first foot or two of the walk behind the cows should slope towards the gutter, as shown in Fig. 5, so that any water falling on it will find its way to the gutter.

THE LITTER CARRIERS.

The overhead track for carrying the litter is so arranged that the four stables can be cleaned with one carrier, if two switches are used. These tracks can usually be built with a slope towards the manure shed, so the carrier will run down itself, and could be hauled back again with weights if so desired. With this arrangement the manure may be taken a good distance from the stable, so the stable is not contaminated as it is where the manure is thrown out at the side or near the door. A good arrangement would be to have a concrete bottom in your manure pit, and then the liquid could be carried from each gutter with an underground pipe, thus saving the labour of hauling it.

Gutters.

If a wooden floor is put in the stable, care should be taken in making the gutter so it will be perfectly water-tight. This can be done by laying a piece of cotton dipped in red lead on the edge of the planks, before spiking them together, when making the gutter, or it can be made perfectly tight with a little calking after the gutter is made. Chemists tell us that the liquid part of the manure is twice as valuable as the solids, so no farmer can afford to allow this to escape through a leaky gutter. These gutters will not require to be as wide as where the cows are tied by the neck, for when they are tied in this way they are obliged to stand where the droppings will all fall in the gutter. A gutter 10 inches deep and 12 inches wide will be satisfactory.

The Ceiling.

The ceiling of a cow stable should be at least 9 feet in height (10 feet would be still better), if the cows are going to have a sufficient supply of pure air. The side walls and ceiling of this stable should be covered with ¾-inch sheathing, or tongue and grooved boarding, so it may easily be kept clean and make the stable warmer as well. In cold climates there should first be rough boards put on the inside of the studs, then paper and sheathing on that again. If then you put on double windows, you would have a stable sufficiently warm to withstand Canada's coldest climate, but it would not need to be as warm as this for the ordinary British Columbia winter.

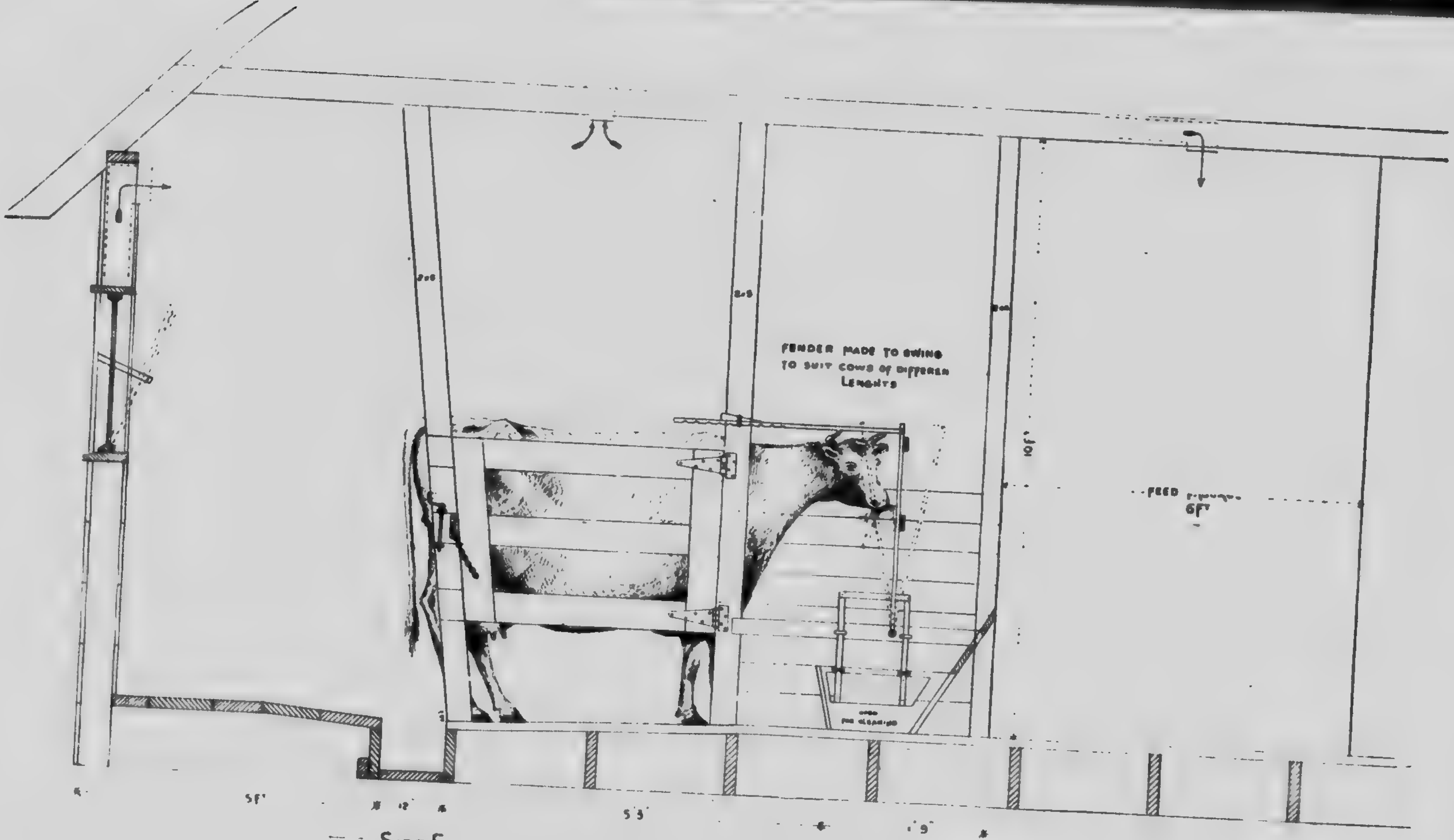
There should be no straw or hay put in the stables above the stock. If hay or straw is put over the stock, no matter how tight the ceiling is made, dust will find its way through and will settle on the animals; then every time this straw or hay is let down, the air is filled with a fine dust which covers everything in the stable, very often a large percentage finding its way to the milk pails.

A Watering Device.

While it is convenient to have water in your stable, arranged so the stock may drink whenever they desire, I have never seen one of these devices kept as clean or sanitary as it should be. If you have a water trough at the side of each stall, an animal will drink while its mouth is partly full of feed; a portion of this will drop into the water, where it is usually left to decay, and unless these troughs are cleaned very frequently, they become foul and quite unfit for stock to drink from.

A more sanitary, and a certainly less expensive, way would be to use galvanized pails, which could be placed at the side of the stall so they would serve to water two animals, and then fill these with a hose from an elevated water tank. These pails could be easily removed for cleaning, and renewed when worn or rusted out. I have seen a small trough placed in front of the stock the entire length of the stable, but the stock will splash a good deal of the water over the sides and keep the mangers in a wet condition most of the time, so I would not recommend its use.

When you have a convenient and easy method of fastening and unfastening your stock, as shown in Fig. 5, it is perhaps as good a way as any to let your stock out for water, provided that the watering place is near the stable, and protected from storms or bad weather. A little exercise in the sunshine and pure air is certainly not injurious to live stock.



SIDE ELEVATION OF LOGAN'S SANITARY COW STALL AND MANGER

SCALE - INCH TO ONE FOOT DESIGNED BY F. M. Logan B.S.A.

Fig. 5.

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SILOS.

Experiments have proven that the stave silo will keep ensilage in as good condition as the more expensive ones, this feature depending almost entirely upon the nature and degree of ripeness of the material stored. This being the case, I do not hesitate to recommend the stave silo for the ordinary farmer—first, because it is less expensive, and, secondly, because it is the least difficult to construct.

THE FOUNDATION.

A good foundation is made by digging a trench say two feet wide, and deep enough to go below the frost line, about where you wish the walls of the silo to come. This trench may be filled with broken stone and gravel, along with a mixture of 1 to 5 of cement and sand. Then there should be a layer on top of this wall made with cement and sand, of about 1 to 3. A drain starting below the level of this wall will be necessary in order to avoid damage from frost. A concrete floor in the silo will not be necessary if a load or two of gravel or loose earth is used.

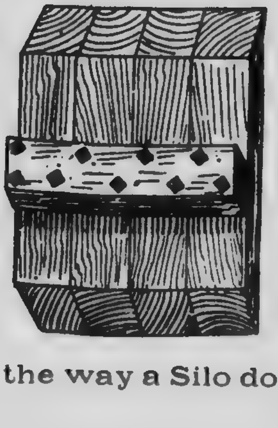
THE WALLS.

The walls of the silo can be built by having planks 2x6 inches, dressed on the inside at least, and on both edges. It will not be necessary to have the edges of the planks bevelled to suit the curve of the silo, as it is found that a tighter silo can be made when this is not done. If they are not bevelled the pressure of the hoops comes upon the inside corners of the planks first, and causes them to give sufficiently to make the joints perfectly tight. If the whole edges of the planks touched each other, there would be little or no give to the wood, so all joints would not be tight. Plank 24 feet in length may easily be procured in this Province; it is, however, quite an easy matter to splice them with bevelled edges, so the inside pressure will cause them to be always tight. A silo should be deep and small, rather than shallow and large, as in feeding out the ensilage the entire top should be fed off each day to avoid having it spoil.

THE HOOPS.

Hoops for the silo may be made of ¾-inch iron rod. If made in two or three sections they will be more easily tightened than if they extend all the way around the silo. These rods may go through wooden standards, or irons can be purchased for this purpose. I have heard of several cases where the hoops burst with the pressure of ensilage, but I think it was probably due to the swelling of the planks, caused by the moisture in the silage, rather than from silage pressure. This can be avoided by slacking the hoops, if necessary, when the silo is being filled. As the pressure is much greater at the bottom than farther up the silo, the hoops will need to be about 2 feet apart at the bottom, while 4 feet apart at the top will be sufficient. If the hoops are bent to the shape of the silo, in an ordinary tire bender, they will be easier to handle. They will need rather long threads to provide for tightening, as the planks will no doubt shrink considerably when the silo is empty.

Doors can easily be made by putting a bevelled saw-cut in a plank where you require the door, and then cutting it out after the silo is erected. In erecting the silo, it will be found a good scheme to put two hoops in place, and then after standing a plank in position, to drive a nail in it and bend it around the hoop. After all the planks are in position it will be only a small matter to tighten the hoops so your silo will be airtight. It is a good idea to dress the first three or four feet of the silo with pitch or tar, as it is at the bottom that decay first begins. A roof over the silo is not absolutely necessary, but would add to its appearance, as well as keep out the rain and snow.



Cut showing the way a Silo door is made.

THE COW STALL.

To design a stall for cows, which would be convenient, and at the same time keep them both clean and comfortable, is a problem which has baffled scores of men. I cannot hope to reach perfection in this regard, but I think the stall shown in Fig. 5 is nearer this mark than any before presented. Some of these ideas have been borrowed from other designs; most of them, however, I think I can claim as original.

KEEP COWS OUT OF GUTTER.

First let me state that no tie which fastens a cow by the neck has yet been devised which will keep her as clean as she should be, or as clean as it is possible to have her.

A cow tied by the neck with a chain, or with the old-fashioned stanchion, has the privilege of stepping forwards and backwards for a distance of two or three feet. This liberty permits her to step back into the gutter, and after getting her feet covered with manure, she will step up on to the platform, where she deposits this dirt, and then lies down in it, with the result that some (far too much) finds its way into the milk pail. The device shown here prevents this entirely. With a rope or chain stretched across the stall just back of the cow it is impossible for her to step back into the gutter, while the fender in front prevents her from going so far forward that she is likely to dirty the platform on which she stands; at the same time, this arrangement gives her more freedom than it would be possible for her to have if she were tied by the neck or head. A further argument in favour of this method is that it prevents a cow from slipping into the gutter when reaching for feed, or when turned out of the stable, which often proves serious, as abortion has doubtless been quite often caused in this way.

TO LET THE COWS OUT.

When you wish to let a cow out of her stall, you open the gate at the side, which, by the way, serves as a division, giving each cow a separate stall. The cow turns and comes out through the stall next to hers, which permits her to step across the gutter instead of into it, as she would do if she were backed out, as is usually done. Before the cows are let into the stable again the gates are closed and fastened, and the chains are unfastened and hooked up at one side. This allows each cow to go into her own stall, after which all that is necessary to make them secure is to walk along behind them and again snap your chains or ropes. Just stop and compare this method with that of trying to get a chain around the neck of a vicious cow, an ordeal which you may accomplish perhaps in ten or fifteen minutes, after receiving several enthusiastic jabs in the ribs, and with one of her horns occasionally implanted in the region of your left eye. Cows tied in this way can be fastened and unfastened in one-quarter of the time required to do this if tied by the neck.

An Improvement at Milking Time.

When you desire to go in beside a cow for the purpose of milking her, you simply open the gate against the cow in the next stall, and the chain being fastened to the gate prevents this cow from backing out of her stall. By being able to swing this partition over against the next cow you have a good deal more space than you would have if the division between each stall were stationary. As a cow is always milked from the right side, this gate must swing to suit.

The Fastening.

I could have designed a fastening for this gate which would have been nearer automatic than the one shown, but it is difficult to have an arrangement which would be automatic and at the same time absolutely secure. This fastening, while not automatic, is not unhandy, and it would be about impossible for an animal to get a gate open if fastened in this way. They are certainly not expensive, as any blacksmith can make them by simply cutting up a bar of half-inch iron, and bending one end in the form of a loop, which serves as a handle, prevents the rod from dropping through the staples, and makes a place to which a string or small chain may be attached for hanging it up. This string can be fastened to a staple, which should be driven in the edge of the upright stud, over the gutter, so the bolt will always hang where it will not interfere with closing the gate, and at the same time be in a convenient place when wanted. Two large sized wire staples with this bolt makes the fastening complete.

Width of Stalls.

These stalls should be about 3 feet 6 inches from centre to centre for the ordinary sized cows. Some make them only 3 feet wide, which does fairly well for small cows, but is too narrow for large ones. It looks better in a stable to have the cows graded according to size rather than to have them indiscriminately mixed. If this were done, the width of the stalls could be made to suit different sized cows. If you should find that a cow is able to turn around in her stall, after the gate is fastened, you can very easily prevent her doing so by making a sort of rack to put on the side of the gate. This can be done by using pieces 1 by 3 inches to put on edge, up and down the gate, and then nailing slats on horizontally, thus making the stall 4 inches narrower than it was before, which will no doubt have the desired effect. This can be put on with screws or wire hooks and removed easily when no longer needed.

The Fender.

You will, of course, have cows of different sizes, and in order to make them stand so all the droppings will fall in the gutter, I have devised a moveable fender, as shown in Fig. 5. As a cow, in lying down, will lower her front part first, she will always lie far enough back in the stall to keep the platform clean, so it is only when she is standing that we need to regulate her position. This fender will compel the cow to stand in the proper position, and can be adjusted to suit different lengths of animals, [illegible]rely taking out the wedges which hold the braces of the fender at a certain notch, and sliding them to the notch desired.

THE MANGER.

The manger of the ordinary stable in Canada is not only a disgrace to the different stockmen, but is an actual menace to the health of the animals. Most of these stables have a manger for each animal, which is desirable, for if there are no divisions the best fighters will get more than their share of feed, and some will not get enough. The objection, however, to individual mangers is that there are four corners to collect rubbish and dirt, and which are usually very difficult to clean, with the result that the manger is always dirty, and in ordinary cases decidedly unfit for stock to eat out of. To do away with the four objectionable corners in each manger, I have devised a plan whereby the lower board in the division can be made to lift up, about six inches, say, so when you wish to clean the mangers you would walk along the passage and hook up all these boards, then take a broom and sweep the dirt from one manger to another till you come to the end. As there would be no corners to dig out, this would require but a few minutes, and you would then have no difficulty in keeping the mangers thoroughly clean. The hay would be fed from the passage way in front, and the slats on the fender should be far enough apart to allow the cow to draw the hay through, but at the same time prevent her from throwing it out of the manger or getting it under her feet. Pulped roots, ensilage, grain, &c., would, of course, be put in from the passage in front, while the cow can get it at the bottom of the manger from the other side of the fender. The mangers could, of course, be made of cement, and the partitions in them of thin steel or wood, which would make them still more sanitary and easier to keep clean.

The question might arise that it would not be wise to sweep the dirt from one manger to another, on account of the danger of spreading contagious or infectious diseases. Authorities on this subject, however, claim that these diseases are spread by the germs becoming dry and floating in the air, rather than by the animals coming in contact with each other, so I think there would be little or no danger if this style of manger were adopted.

THE CHAIN AT THE REAR.

A light wire link chain, with a snap on one end, would make the cleanest and best arrangement to put across each stall to keep the cow from backing out. These chains can be purchased for about 25 cents each, and should last a life time. The staple on the gate to which this chain is attached should be in a plate and put on with screws or bolts, as it would be liable to split the board or pull out if simply driven into the wood. Some hardware dealers are communicating with an eastern firm in regard to having these specially made, so any one requiring them will be able to procure them at very moderate rates.

THE HORSE STABLE.

As the construction of this stable is very similar to that of the cow stable, it will not be necessary for me to write very much by way of explanation. The height of ceiling, side, walls and ventilation system may be the same.

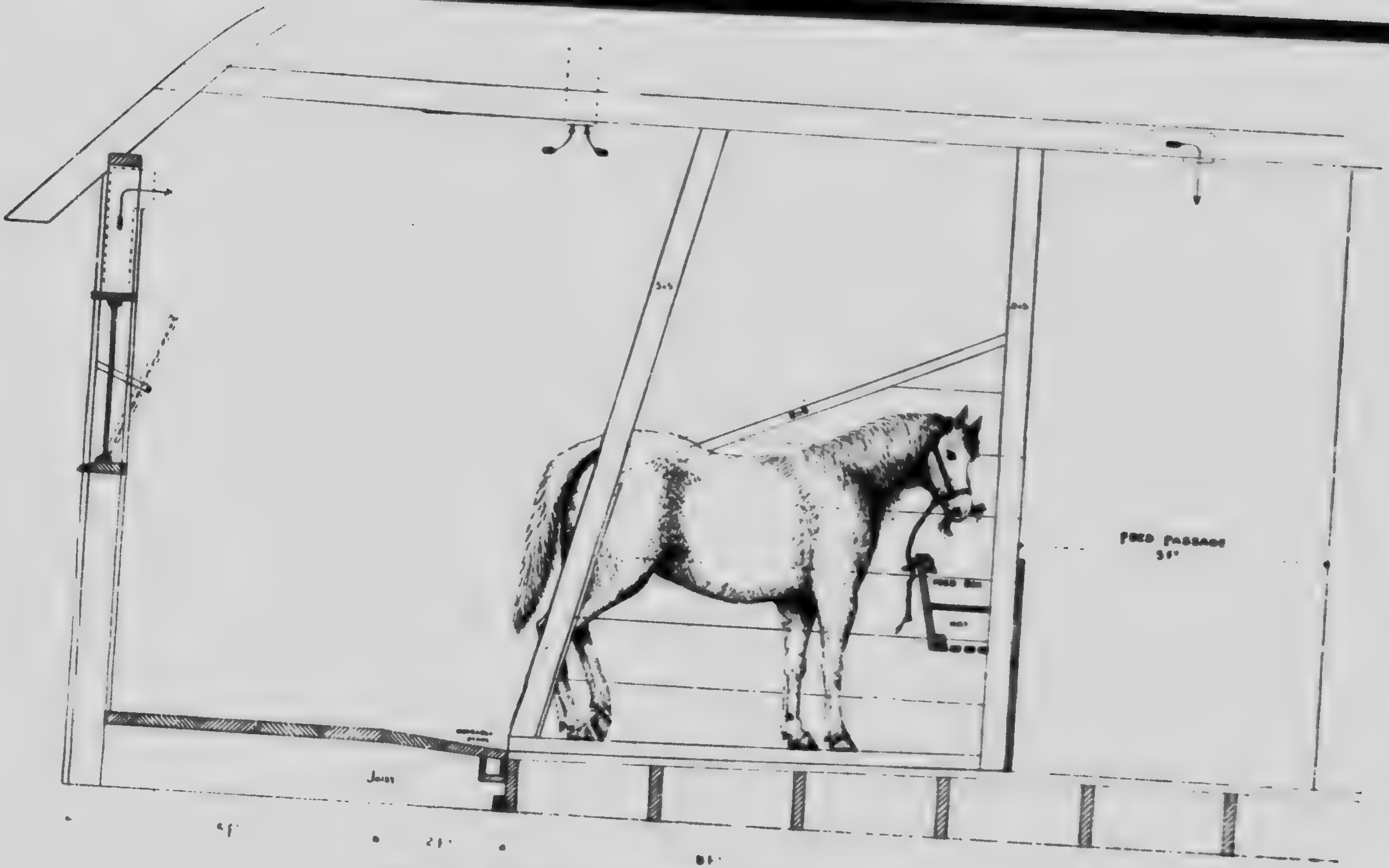
Floor.

The floor, as shown in the design, is of wood, but, of course, may be made of concrete or other material more durable than wood. An important feature in connection with a floor for horses is that it be sufficiently tight to prevent any liquid from escaping. We are informed upon good authority that one pound of this liquid is worth as much as three pounds of the solid excrement from horses, so no farmer, with ordinary intelligence, will allow it to be wasted. If it is desired to pipe the urine to a manure shed, a gutter such as described in Fig. 6 may be put in quite easily; but if you do not wish to pipe it, probably a better plan is to make the floor water-tight and absorb this liquid with a good supply of litter. Part of the walk behind the horses should slope towards this gutter, so the remainder of this walk may be kept dry. This should be done whether the gutter is put in or not. Unless it is intended to carry this liquid away by piping, I would suggest that it be absorbed by litter, as there is always considerable difficulty in keeping a closed gutter like this in a good, sanitary condition.

For directly under the horses, a good floor is made by using 2-inch planks for the first floor, which should have about 2 inches of a slope towards the gutter, and be made perfectly tight. Then, on top of this floor, there should be planks 3 by 6 inches placed about 1 inch apart. If this is done, the liquid will run through to the under floor and be carried to the gutter, while your horse will lie perfectly dry. These cracks may be cleaned out occasionally with a hook fastened to a wooden handle. When these planks wear out they can easily be taken up and renewed, without disturbing the remainder of the floor. The planks forming the walk behind the horses should run in the opposite direction from those in the stalls, as it will be much easier to keep them cleaned if they do.

The Manger.

The bottom of a manger should be made with slats about 3 inches in width, and left about 2 inches apart so the dust, seeds, mud, gravel, etc., will fall through. I have seen mangers which had been collecting rubbish of this sort for years, and had never been cleaned; a condition for which there is no excuse, and for which a man should be severely punished. There could, perhaps, be no better way of encouraging disease among horses than by this method, as well as making the feed of the horses unwholesome by allowing it to become mixed with this stale, often partially decayed, feed. If narrow slats, as described above, are used, all this dirt would fall through to the floor, and the horse would always have a clean manger.



SIDE ELEVATION OF LOGANS MODEL HORSE STALL AND MANGER

DESIGNED BY F. M. Logan B.S.A

SCALE – INCH TO ONE FOOT

Fig. 6.

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If the grain box is made 9 inches or a foot in depth, there will be little danger of a horse wasting his feed. If it is made the entire width of the manger it will be large enough, even if cut hay is mixed with the grain. The boarding on the manger next to the horse's breast need not extend to the floor, as there is no danger of a horse getting his feet fast under the manger, provided that these boards do not run within 15 or 18 inches of the floor.

Stalls.

Horse stalls are usually too narrow to be convenient, or to furnish the horse with any comfort while lying down. For large horses they should be at least six feet, and for horses of ordinary size not less than five feet in width. A good partition for horse stalls is made by putting up a post 5 x 5 inches at the rear where you wish each division to be. These posts should be planed and the two outside corners taken off. Good partitions may be made with 2-inch planks, dressed, starting from the centre of this post and running to the passage-way in front. A piece of 1½-inch quarter-round, nailed firmly at each side of these planks to the post, will keep them in place at the rear, while they may be kept in place in front by nailing to a 2 by 4-inch stud. A piece of 2 by 4-inch, with the corners taken off, nailed directly on top of these partitions, will serve to keep the short planks firmly in place, as well as make a finish for the top.

These divisions take up little space, and if properly constructed will be sufficiently strong for all practical purposes. The ceiling should be at least ten feet high, and covered with planed boarding of some sort, so it may be kept clean. If oiled or painted, it will add much to its appearance, as well as making it more sanitary. It may be boarded in front of the horses, along the feed passage, or left open, according to the climate of the location. If boarded up, slides in front of each manger for feeding would be more suitable than hinged doors, as they would not interfere with the feed carrier in the passage way.

A grain box could be located in the harness room, opening towards the feed passage, or a small one could be put on the feed carrier, which would perhaps be still more convenient.

You will notice that the walk behind the horses is seven feet in width. This will permit a pair of horses to be harnessed here, and as the passage leading to the feed passage and to the main barn is the same, will allow a pair of horses to be driven through when walking abreast. This will be found convenient, especially in rainy or stormy weather. A door-way could be cut through from the passage behind the horses into the drive-way of the main barn, and the passage beside the harness room utilised for something else, but I do not think it would be as convenient as the arrangement shown on the plan.

As horses are seldom fed upon green feed, the door at the end of the feed passage will not be necessary in the horse stable. The plan shows this feed passage to be five feet wide, but if a feed carrier is used for feeding the stock it would be better to make the stable one foot wider, so this could be a six-foot passage.

THE STABLE FOR YOUNG STOCK.

The design does not show any particular arrangement of this stable, as it would depend largely upon the size of the stock for which it was required. If part of it were required for calves, a good way would be to allow them to run loose, except when being fed, when each one could go up in a narrow stall, and a board, which would include four or five of these stalls, could be dropped behind them, shutting them in. This could be worked from the feed passage with a cord and pulleys. They could be kept in these stalls as long as desired, and thus prevented from sucking each other after being fed.

Other young stock, ranging from one to two years of age, would probably do best if permitted to run loose, especially if they were dehorned.

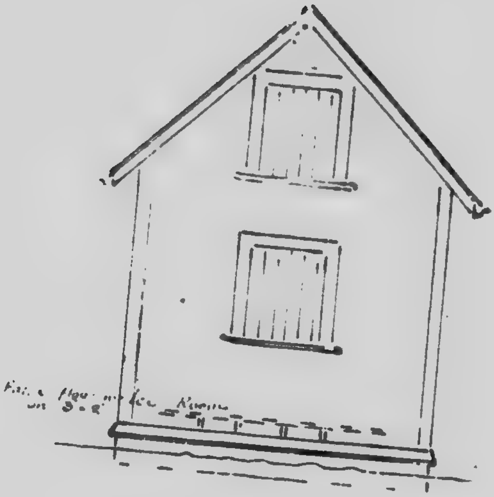
It would be convenient to have a few box-stalls in this stable for sick animals, or so animals affected with a contagious disease could be isolated.

THE FARM DAIRY BUILDING.

Travelling through the farming districts of Canada, we find only about one farmer in fifty who stores any ice for summer use. This seems ridiculous when you consider how useful it is, especially on a dairy farm, and how easily it is procured in almost every part of Canada. There are portions of British Columbia along the coast where ice does not form sufficiently thick for storing purposes, but in all other parts of Canada, and in a large part of this Province there is ice in abundance, so it seems strange that more of it is not used.

In the design I have shown, the ice is stored in one end of the building, where the walls are stuffed with about 12 to 15 inches of sawdust, so it is not necessary that any sawdust should come in contact with the ice. The ice rests on a false floor, raised about 4 inches from the main floor, which allows the air to circulate between the two. In putting in the ice a space of about 4 inches is left between the ice and the end wall of the ice house, but should be packed close to the wall on each side.

As the air warms in the cool room it rises, and goes into the ice house from the top or ceiling of the cool room. It then goes to the top of the ice house and as it cools it finds its way down the space between the end wall and the blocks of ice, then under the false floor and out into the cool room again, making a complete circle around the pile of ice. In this way the cool room is kept at a low temperature without moving the ice after it is once stored.



END ELEVATION

MODEL FARM DAIRY BUILDING

Designed by F M Lowne

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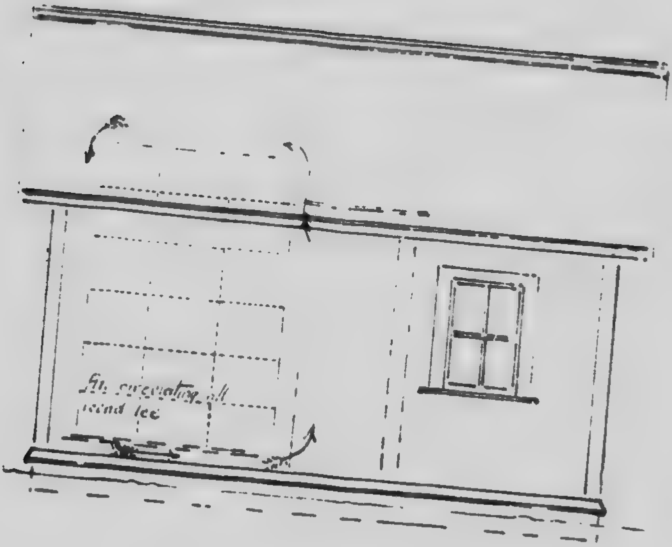
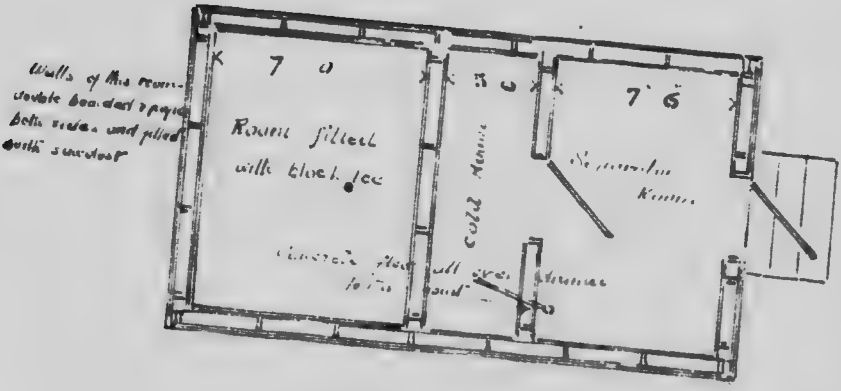
Fig. 7.



SIDE ELEVATION


Walls of this room double boarded & paper both sides and filled with sawdust
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Room filled with block ice
Cold Room
Separator Room
Concrete floor all over drained to the ground

FLOOR PLAN

Outside Measurement 18 0 x 10 0

Fig. 7.

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There should be a door near the ceiling of the cool room opening into the ice house, sufficiently large to admit of taking through a cake of ice, so a piece could be taken from the ice house, if necessary, without letting in warm air from the outside. The cheapest and best floor for this building is one made of concrete, and should be sloped, so the water from the melted ice, or from any other part of the building, will run to the drain pipe in the separator room.

For the ice house a good wall is made by putting up two sets of 2 by 4 studs, which will admit of a thick wall of sawdust. These walls may be made of ordinary rough boards, and if two rows of studs are used, the oards should be put on next to the sawdust, so the pressure of the sawdust vill press the boards against the studs rather than off them. These walls hould extend up to the roof, above the door in the end ; there should also e a double ceiling with a good thickness of sawdust between, as the keep- ng qualities of the ice depends upon excluding the warm air from outside.

The outside walls should be made as tight as possible. A good way to do his would be to board on the outside of studs with shiplap and rustic, with aper between. A suitable inside lining for the cool room would be shiplap, ith tongued and grooved boarding and paper between. This makes a dead r-space, which, if made air-tight, is more effective than if stuffed, but if is not perfectly air-tight, it should be stuffed with sawdust, mineral wood, al dust, or some other good non-conductor. It is not necessary that e walls of the separator room be as tight as those of the cool and ice oms, but the better they are built the more satisfactory your building will . Shingles will do for the roof, but a better one could be made with some those non-conducting felts for roofing purposes.

If the average farmer had a building such as this for keeping his milk d cream, the creameries and cheese factories would not have one-quarter the amount of sour milk and cream to worry them, and would be able to duce dairy products of much improved quality. There are one hundred s that this cool room could be put to during hot weather, making the life he poor housewife, who has to stand over a hot stove and cook for a pack hungry farm hands, far more endurable and humane.

On the Coast, where ice does not form, a dairy house as large as this ld not be necessary. It should, however, be large enough for a separator a place for cooling the milk or cream. A good supply of water is most ortant.

If a concrete floor is not put in, a good way to arrange the wooden floor have it made with a good slope, and the flooring at the lowest side to nd through the wall of the building, so that all the washings of the floor be carried outside the building and caught in a drain so it will run away the building.

MATERIAL FOR BUILDINGS.

The following specifications give the amount of material necessary for the construction of each of these buildings, with an approximate estimate of the cost of windows, doors, etc., frames and fixings included. The cost of these articles vary in different localities, but we have endeavoured to adopt average prices for Canada. After finding out the price of lumber in his locality, any man who wishes to build can easily arrive at the approximate cost of constructing buildings of this size and design by consulting these specifications. Larger buildings would be proportionately a little less expensive, while smaller ones would cost a little more in proportion to their size, as the same doors, ends of building, etc., would be necessary if smaller sizes were adopted.

Specifications for Main Barn

(84 FT. BY 40 FT. 6 IN.).

Planks for making arches—440 pieces, 9 ft. 6 in. by 10 in. by 2 in.	7,000 ft.	
Joists for floor—63 pieces, 28 ft. by 10 in. by 2 in.	3,000 "	
65 pieces, 14 ft. by 10 in. by 2 in.	1,500 "	
Sills—12 pieces, 28 ft. by 8 in. by 10 in.	2,200 "	
Studding for sides—54 pieces, 16 ft. by 6 in. by 2 in.	800 "	
Short rafters—22 pieces, 18 ft. by 6 in. by 2in.	400 "	
Studding for ends—35 pieces, 28 ft. by 8 in. by 2 in.	1,300 "	
Studding for root cellar and granary—70 pieces, 11 ft. by 8 in. by 2 in.	500 "	
Roof sheeting (open)—6 in. by 1 in.	3,600 "	
Rustic for sides and ends—8 in. by 1 in.	6,000 "	
Flooring for entire barn—12 in. by 2 in.	7,000 "	
12 in. by 1 in.	1,200 "	
Partitions around root cellar and granary—tongued and grooved, 6 in. by 1 in.	4,500 "	
For covering over feedroom, root cellar, etc—shiplap, 8 in. by 1 in.	1,200 "	
		40,200 ft.
Shingles for roof, laid 4½ inches	54,000	
		54,000
Windows—4 windows, 12 lights, 10 in. by 16 in. (approximate)	$25 00	
6 windows, 4 lights 12 in. by 14 in.	24 00	
Doors—2 roller doors, 13 ft. by 13 feet (framed), complete	25 00	
2 roller doors, 11 ft. by 10 ft. (battened), complete	12 00	
Carried forward	$86 00	

SPECIFICATIONS FOR MAIN BARN—*Concluded.*

Brought forward......	$86 00	
Doors—*Concluded*—		
3 roller doors, 10 ft. by 7 ft. 6 in. (batt'd), complete	15 00	
2 " 8 " 4 " " "	8 00	
2 hinged doors, 7 ft. by 3 ft. 6 in..............	8 00	
2 double doors for gables, 8 ft. by 6 ft..........	16 00	
Two dormer windows on roof...................	25 00	
Three ventilators on ridge....................	50 00	
Eight kegs of nails............................	30 00	
Twenty-eight concrete piers (8 bbls. cement)......	25 00	
Feed carrier (complete).........................	50 00	
Hay carrier (with track)........................	25 00	
Cost of labour for building (estimate).............	200 00	
		$538 00

Specifications for Cow Stable

(60 BY 32 FEET).

Sills—10 pieces, 32 ft. by 10 in. by 8 in.............	2,000 ft.	
Joists—56 pieces, 24 ft. by 2 in. by 10 in...........	2,200 "	
Studding for sides—53 pieces, 10 ft. by 2 in. by 6 in..	500 "	
Studding for ends—20 pieces, 20 ft. by 2 in. by 6 in..	400 "	
Tie beams—26 pieces, 30 ft. by 2 in. by 6 in.........	800 "	
Rafters—52 pieces, 24 ft. by 2 in. by 6 in...........	1,250 "	
Stays for rafters—52 pieces, 9 ft. by 2 in. by 6 in....	450 "	
Flooring—Planks, 2 in. by 12 in....................	4,000 "	
Roof sheeting (open)—1 in. by 6 in................	2,000 "	
Rustic—1 in. by 6 in..............................	2,600 "	
Shiplap for inside sheeting.........................	3,500 "	
Lumber for 35 cow-stalls—Dressed lumber, 1 in. by 6 in.	1,000 "	
" studding, 1 in. by 5 in.	600 "	
" " 1 in. by 4 in.	300 "	
" planking, 2 in. by 12 in.	800 "	
		22,400 ft.
Shingles for roof..................................	30,000	
Litter carrier (complete)...........................	$55 00	
Windows—17, 4 lights, 12 in. by 14 in. (estim'd. cost)	60 00	
Two ventilators on ridge............................	30 00	
Nails...	15 00	
Four doors (roller), 7 ft. 6 in. by 5 ft..............	20 00	
Two " " 7 ft. 6 in. by 6 ft..............	10 00	
Eighteen concrete piers (5 bbls. cement)............	16 00	
Labour for building stable...........................	100 00	
		$306 00

If concrete floor were put in this stable instead of wood, the joists, cross sills and flooring mentioned would not be necessary. These amount to about 6,000 ft. of lumber. The cement required would be about 40 bbls., with about 150 bbls. of sand and gravel to lay floor 4 in. deep.

The labour in putting down a cement floor would amount to probably $15 or $20 more than if wood were used.

Specifications for Horse Stables

(74 BY 32 FEET).

Sills—6 pieces, 32 ft. by 10 in. by 8 in	1,300 ft.	
Joists—72 pieces, 24 ft. by 10 in. by 2 in	2,850 "	
Studding—66 pieces, 10 ft. by 2 in. by 6 in	650 "	
10 pieces, 20 ft. by 2 in. by 6 in	200 "	
Tie beams—33 pieces, 30 ft. by 2 in. by 6 in	1,000 "	
Rafters—66 pieces, 24 ft. by 2 in. by 6 in	1,600 "	
Braces—33 pieces, 18 ft. by 2 in. by 6 in	600 "	
Flooring—Space 74 by 32 ft	5,000 "	
Sheeting for roof (open)	2,400 "	
Rustic for sides	2,500 "	
Shiplap for inside sheeting	4,000 "	
Planking for horse-stalls—16 ft. by 2 in. by 16 in	1,000 "	
Posts and boarding, etc	600 "	
		23,700 ft.
Shingles for roof	36,000	
		36,000
Windows—21, 4 lights, 12 in. by 14 in. (estimated)	$80 00	
Nails	15 00	
Three doors, 7 ft. 6 in. by 6 ft	15 00	
Two " 7 ft. 6 in. by 5 ft	10 00	
Eighteen foundation piers (5 bbls. cement)	15 00	
Ventilators on ridge	30 00	
Labour in constructing	100 00	
		$266 00

Specifications for Two Silos

(12 BY 24 FEET).

Dressed lumber, 24 ft. by 2 in. by 6 in	4,000 ft.	
Sixteen iron bands, $\frac{1}{2}$-in. rod iron (complete), est. cost	$30 00	
Cement for foundation	10 00	
Labour in construction	25 00	
		$65 00

Specifications for Dairy Building

(18 BY 10 FEET).

Studding--72 pieces, 8 ft. by 2 in. by 4 in	400 ft.	
Sheeting for roof—1 in.	300 "	
Shiplap for sides—1 in. by 6 in	500 "	
" ice room—1 in. by 6 in	300 "	
Rustic for sides	500 "	
T. & G. sheeting for cold and separator room	550 "	
		2,550 ft.
Shingles for roof	3,000	
Cement for floor (3 bbls.)	$10 00	
One window	5 00	
Four doors	10 00	
Nails, paper, etc	10 00	
Labour in construction	35 00	
		$70 00

CONCLUSION.

I have endeavoured to design and explain in this bulletin farm buildings which are practical, convenient and sanitary, and at the same time so moderate in cost that the farmer of ordinary means may adopt them.

The majority of farm buildings in Canada are entirely devoid of ventilation, except what gets through badly constructed walls, while windows are luxuries very seldom indulged in. The day will come when these features will be compulsory in every stable where animals are kept. I trust Canadian farmers will not wait till they are compelled to act. These things will pay in the better health of your animals, so the sooner they are adopted the better it will be for both the stock and its owner. I should like to again recommend the adoption of the cow-stall, as I believe it will, if installed, do more to improve the quality and flavour of dairy products than is possible to accomplish in any other way.

Large sized blue-prints of these designs, which would be very useful for any one who wishes to build according to this plan, may be obtained upon application to the Department of Agriculture at about 10 cents per square foot, or $3 for the complete set.

Trusting that this bulletin will be of some use to the general public, and will accomplish some of the objects for which it is intended,

I remain,

F. M. LOGAN,

Live Stock Commissioner and Dairy Inspector for B. C.

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